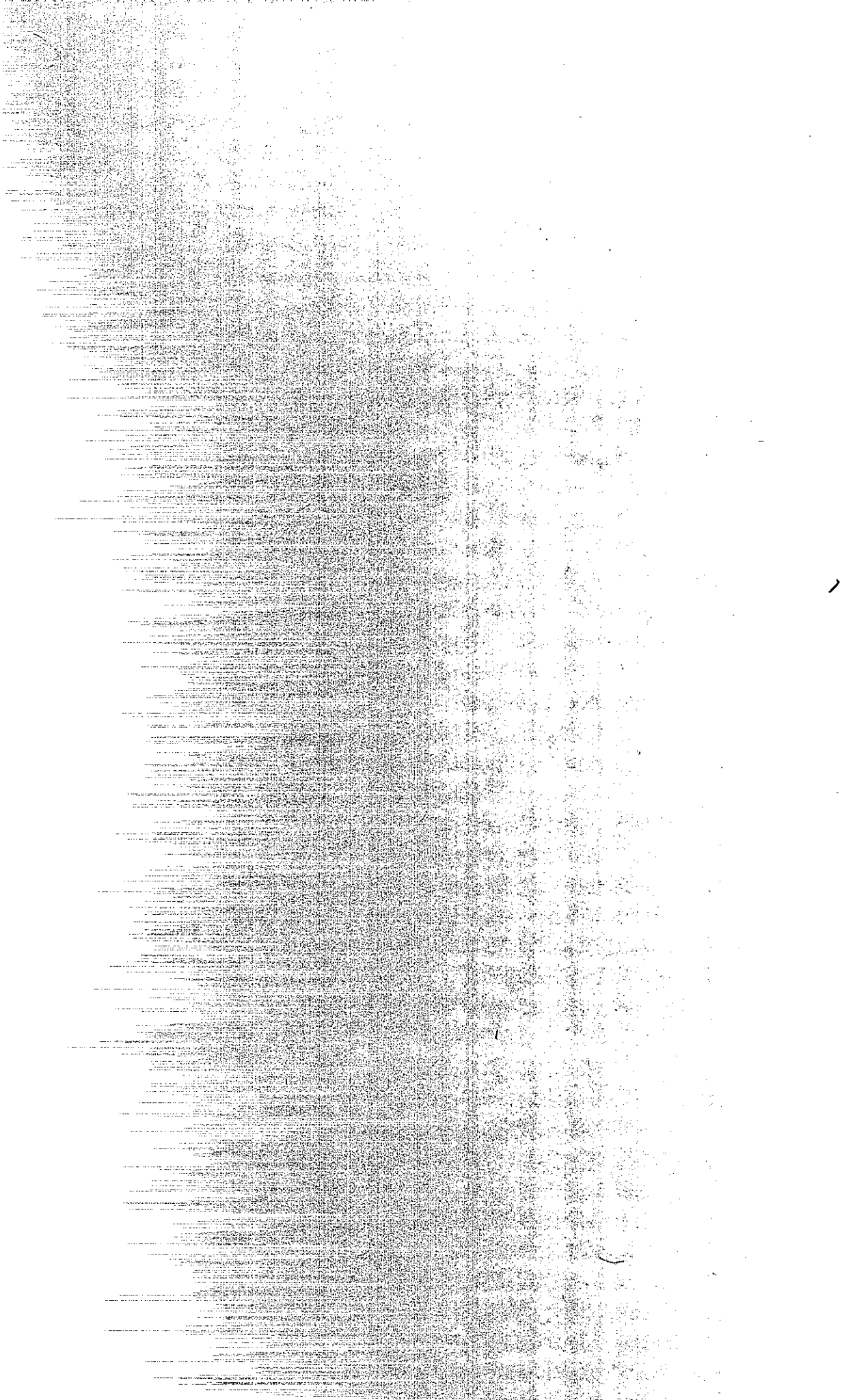


SSMR-Reflector T 213-11

State of California
Transportation Agency
Department of Public Works
Division of Highways

Materials and Research Department

October 4, 1965
Laboratory Project
Work Order 440438

Mr. Lyman R. Gillis
Assistant State Highway Engineer
Division of Highways
Sacramento, California

Dear Mr. Gillis:

Submitted for your consideration, is a final report on:

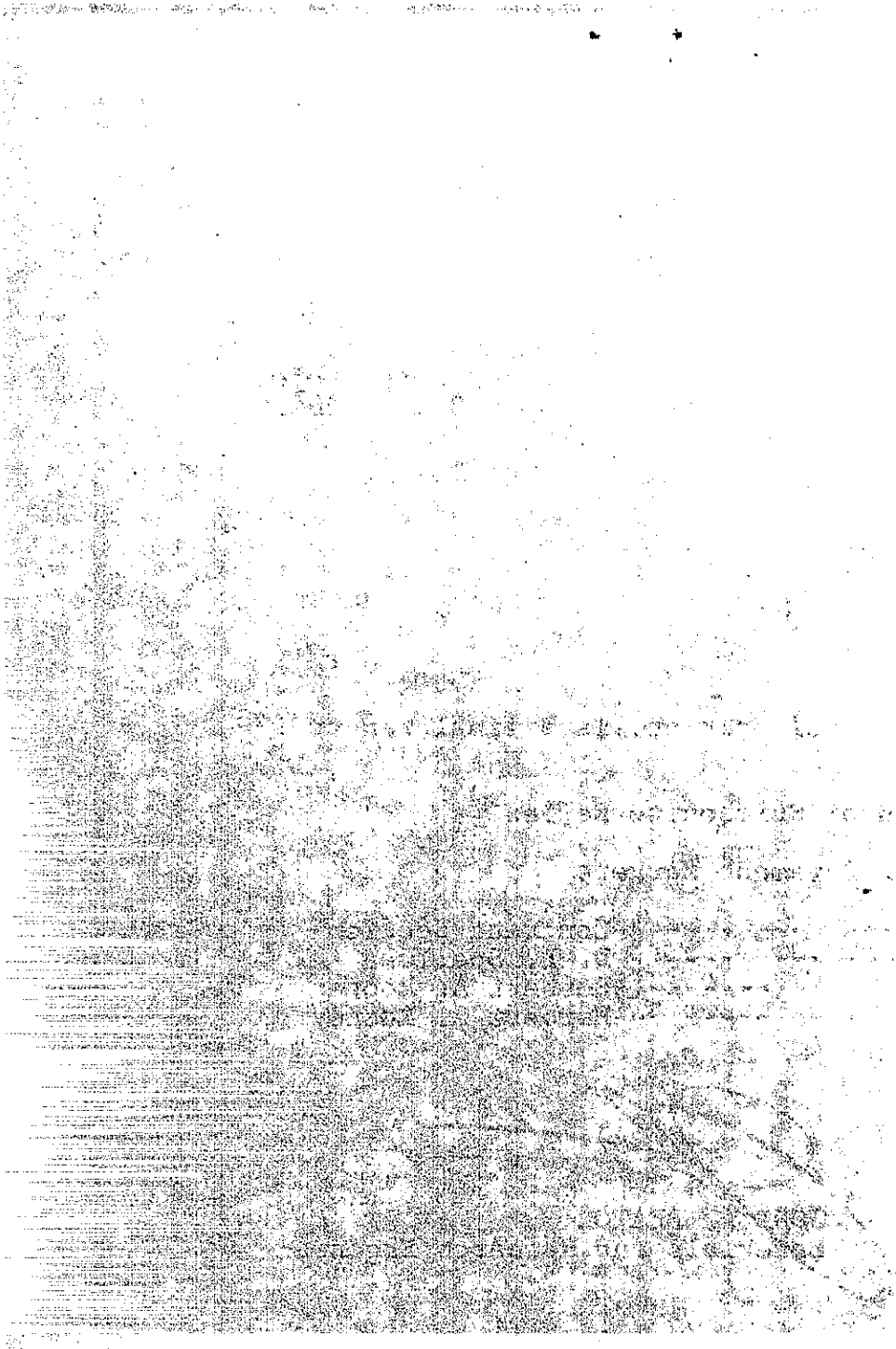
Installation of Stimsonite Reflex

Reflector Pavement Markers

Study made by ----------Concrete Section
Under general direction of ----------D. L. Spellman
Work supervised by ----------Herbert A. Rooney
Report prepared by ----------Herbert A. Rooney

JOHN L. BEATON
Materials and Research Engineer

cc: ELTinney
JEWilson
CGBeer (3)
GBSherman
DLSpellman
Research Files
HARooney



State of California
Department of Public Works
Division of Highways

Materials and Research Department

October 4, 1965
Project Work Order
440438

FINAL REPORT

Installation of Stimsonite Reflex Reflective Pavement Markers

This State financed project work order as originally planned is completed and will be terminated. It will be about five years before a final evaluation can be made of the durability and continued effectiveness of these markers installed at the five different locations under the funds provided by this project.

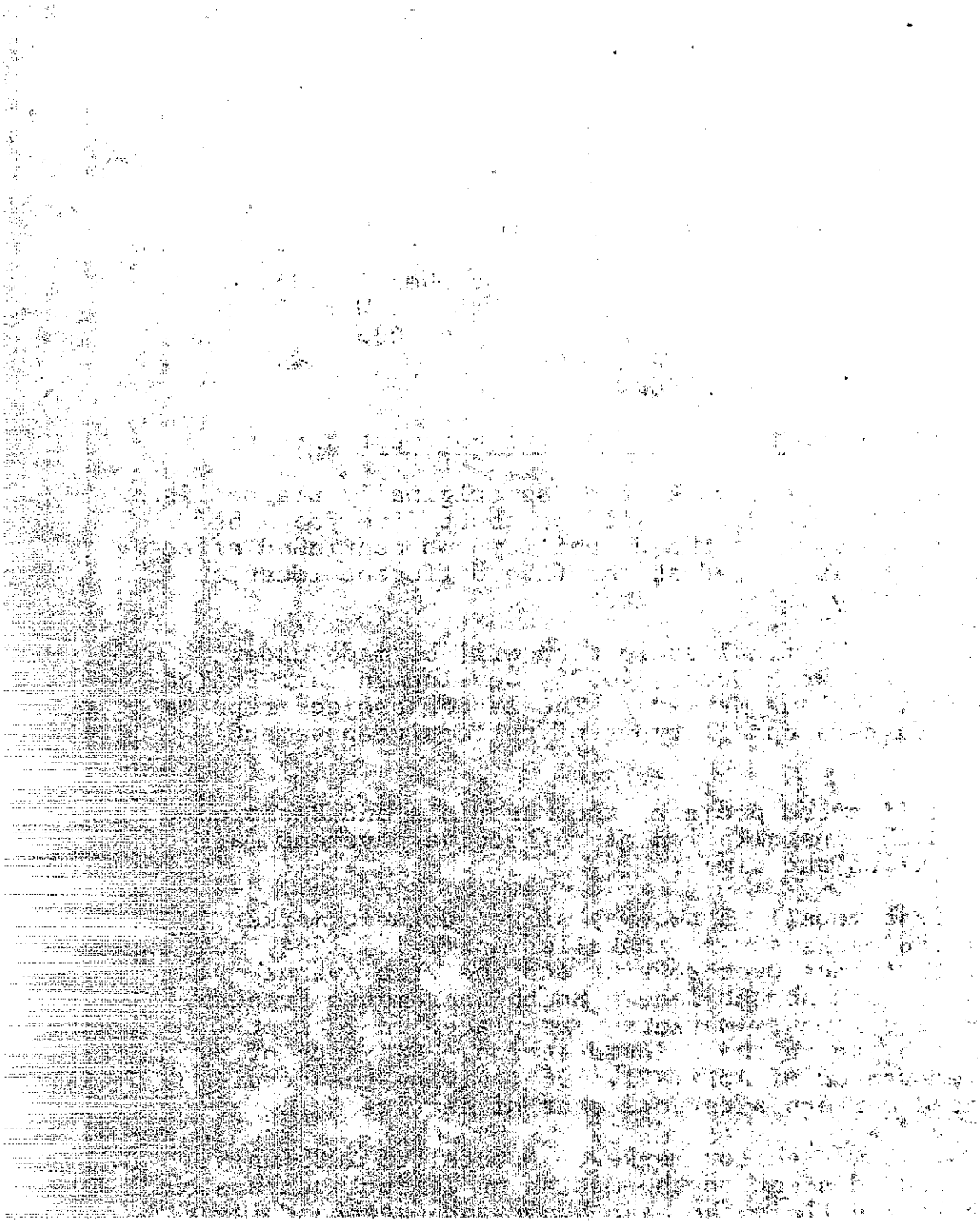
It is expected that the final evaluation will be made under federally financed Project Work Order 240398, Development and Evaluation of Reflective Traffic Lane Markers. The latter project reports will include evaluation data on all types of reflective pavement markers.

Under this State financed project, the Materials and Research Department supervised the installation of reflective pavement markers at the following locations and times.

1. Model 88 (first model), a two-way silver colored marker. A total of 188 markers were installed April 15, 1964, between the 12th Avenue Overcrossing and the 21st Avenue Undercrossing, southbound lanes, South Sacramento Freeway, in both traffic lanes. Markers were placed on 24 foot centers in the gap in the painted stripe. See copy of attached memorandum of April 21, 1965, giving the condition of these markers after one year of service.

2. Model 88, a two-way yellow marker. A total of 2088 units were installed adjacent to the median on 24 foot centers on L.A.-10 Kellogg Hill in the east bound and westbound lanes between August 26, 1964, and September 1, 1964. Roy Smith, Maintenance Superintendent in District 07, advised on September 20, 1965, that these markers are now about 50% as effective at night as they were when first installed. He attributed this to the fact the markers become covered with dust and dirt which are not removed by traffic, since traffic seldom crosses the double yellow "line".

3. Same type as in (2) except 44 markers were installed adjacent to the median in the vicinity of Mack Road on the southbound lanes of the South Sacramento Freeway.

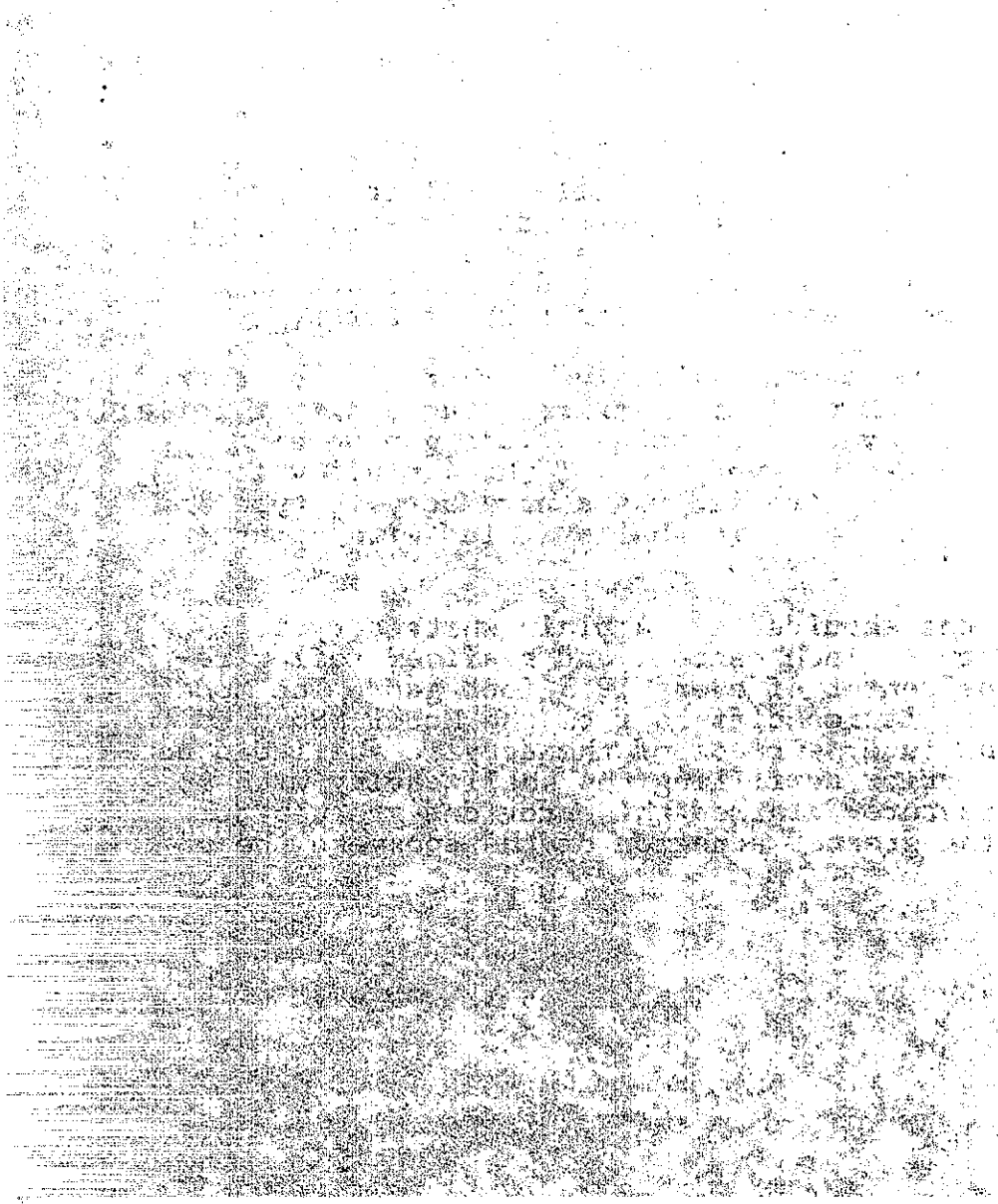


4. On March 16 and 17, 1965, a total of 197 Model 88b Stimsonite Reflective Pavement Markers were installed on the South Sacramento Freeway, southbound lanes, between 2nd Avenue and 12th Avenue. One marker was placed in every other gap of the painted stripe.

5. In two lanes, each about 0.5 miles long, Model 88b Stimsonite plain white non-reflective and silver reflex reflector pavement markers were installed on the North Sacramento Freeway, southbound, south of Marconi Avenue during the latter half of September, 1965. In both lanes the painted traffic stripe was removed. They were installed in two different patterns.

   In the center lane, 4 white non-reflective markers 3 feet apart with a 15 foot gap between sets of 4 markers, and a silver reflex marker in the center of every alternate 15 foot gap were installed. The first marker of every set of the 4 plain white markers in the direction of traffic was a pure acrylic type and the other three were white acrylic shells filled with epoxy and sand.

   In the lane nearest the shoulder the 4 plain white acrylic markers were placed on 18 inch centers and a silver reflex reflector placed in the center of every 19.5 foot gap. The Model 88b used on this installation differs from the Model 88b used in (4) above in that the inner surface of the acrylic shell did not have a coat of paint prior to filling the shell cavity with epoxy and sand. The manufacturer claimed this provided greater durability because of the greater adhesion of the epoxy to the unpainted shell.



State of California

Highway Transportation Agency

Memorandum

To : Mr. John L. Beaton
Materials and Research Engineer

Date: April 21, 1965

File : PWO 440438

From : Department of Public Works—Division of Highways
Materials and Research Department

Subject: Inspection of Stimsonite Reflective Markers

On April 19, 1965, a walking survey was made of the Stimsonite markers installed on the South Sacramento freeway one year ago. The units were rated in four general categories by Mr. Rooney and myself. The results were as follows:

	1 "Normal" wear (no Significant Damage)	2 Slight Damage to Case (Pits, Chipped Edges, etc.	3 Serious Damage (Large Cracks and Pieces of Case Missing)	4 Markers Missing
Left Line (nearest Median), 100 Units				
No.	52	27	11	10
%	52	27	11	10
Right Line (nearest Right Shoulder) 88 units				
No.	38	22	25	3
%	43	25	29	3
Averages for the Whole 188 Units				
No.	90	49	36	13
%	48	26	19	7

FORM WH-38 REV.

Of the 90 units in Category 1, no significant damage - there were 27 units which had some failure of the silvered surface, from 10% to perhaps 30% of the total reflective surface being affected. Of course, there were other units that also had silver damage in the other categories (2 and 3), but the significant factor was the loss of silvered surface in units that were otherwise sound. In a few cases, we noted the presence of water under the plastic case of the undamaged markers which may have caused some of the damage to the silvered surface. There is reason to believe that even though there is good reflectivity in the damaged units at this time, their effectiveness as markers is quite likely to decline rapidly from now on, and that within another year, they will be ineffective.

Most of the missing markers were installed across the center line joint. It is believed that movement at the joint caused the marker to be lost by shearing of the concrete. The loss of markers just counting those not installed across a joint, would be 2% or 3%.

Since all markers are functioning fairly well from a reflective standpoint, a night survey would not indicate the true physical condition of the installation. The old Model 88 Stimsonite units do not appear to be nearly as durable as epoxy dots. Based on this survey, their estimated life is about 5 to 8 years.

Original Signed by
D. L. Spellman

D.L. Spellman
Assistant Materials and
Research Engineer - Concrete

HAR/
DLS:fp
cc: HARooney
ROWatkins